



## QMBBox75 series devices:

QMBBox75-8, QMBBox75-16,  
QMBBox75-24, QMBBox75-64

Technical Description and User Manual.

Revision 2.1.

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- Common questions

- Sales department

- Technical support

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## 1. General information

The QMBox75 series devices are relay switching devices with USB 2.0 interface.





Depending on their model, the devices may feature 8 to 64 independent, galvanically isolated relays. The devices are designed for the commutation of signals and for discrete control of power equipment: heaters, lighting systems, high-voltage switchers, etc.

The QMBox75 series devices are controlled by the PC connected via USB 2.0.

### **Features**





- Max. switching voltage/current: up to 400V / 5A (per channel);
- High-voltage galvanic isolation of relays: 3 kV;
- Channel-to-channel galvanic isolation;
- Free PC software (Windows OS).

## 2. Specifications

Model	QMBox75-8	QMBox75-16	QMBox75-24	QMBox75-64
Number of relays	8	16	24	32 to 64
Design				
Relay type	Electromagnetic			
Max. switching current	3 A (5 A for 1 sec)			
Max. switching voltage	$\pm 250$ V (allowable inductive load switching at overshoot of up to $\pm 400$ V)			
Galvanic isolation of relay channels from USB	3 kV			
Channel-to-channel galvanic isolation	750 V			
PC interface	USB 2.0			
Power supply	100–240 V AC or 24 V DC			
External environment	from +5°C up to +55°C with relative moisture from 5% up to 90%			
Dimensions, mm	140x190x40	140x190x60	140x190x80	260x260x160

### 3. Architecture

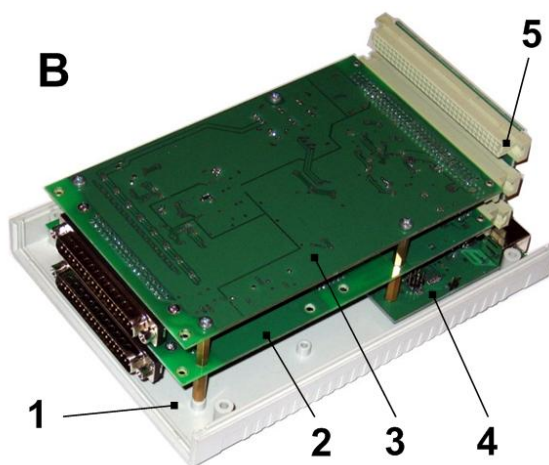
The basic components of QMBox75 devices are 8-channel **QMS75** relay switching modules that are installed into one case. Depending on the number of modules installed, a QMBox75 device can have 1-, 2-, 3- or 8-module configurations, thus, different models of the device differ in the number of relays.

				
<b>Model</b>	<b>QMBox75-8</b>	<b>QMBox75-16</b>	<b>QMBox75-24</b>	<b>QMBox75-64</b>
<b>Number of the QMS75 modules installed</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4 to 8</b>
<b>Number of relays</b>	<b>8</b>	<b>16</b>	<b>24</b>	<b>32 to 64</b>
<b>Dimensions</b>	<b>140x190x40 mm</b>	<b>140x190x60 mm</b>	<b>140x190x80 mm</b>	<b>260x260x160 mm</b>

The two-module device QMBox75-16 is used to demonstrate QMBox75 internal construction:



A – the assembled device;



B – the same device with the cover removed;

1 – Bottom shell

2, 3 – QMS75 relay switching modules – 2 pieces

4 – Interface board that controls operation of the modules and ensures connection of the device to the computer via USB

5 – Interconnect board that ensures electric connection of the modules to the interface board.

Inside the case the QMS75 modules are plugged into the slots of the interconnect board. This board joins the modules into a single device and ensures electric connection of the modules to the interface USB board. The interface board controls operation of the modules and ensures connection of the device to the PC via USB.

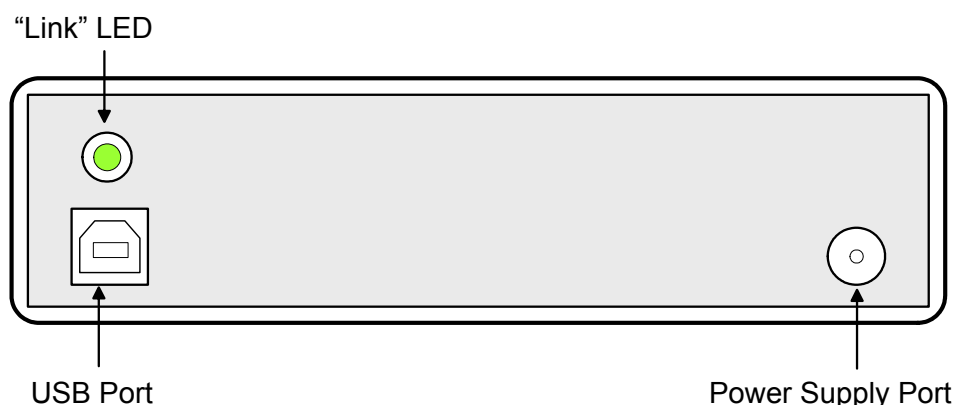


*This scalable modular architecture allows to combine modules of different types (ADC, DAC, Discrete I/O, etc.) in a single device. These modules can be combined in one device in any configuration. For detailed information about Combined devices, see <http://www.rtechelectronics.com/products/qmbox/index.php>*

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## 4. Connecting the device

The figure shows the rear panel of a QMBox75 device:



**"Link" LED** — turns on when the device is connected to USB and signals that the USB port of the computer has identified the device correctly.

**USB port** — type B. A standard connector for connecting the device to the PC via USB with an standard USB A-B cable.

**Power Supply Port** — it is used for supplying power from an external supply included in the delivery set.

The procedure of connecting the QMBox series devices is as follows:

1. Connect the power supply from the delivery set of the device to the Power Supply Port of the device.
2. Connect the power supply from the delivery set of the device to AC network.
3. Connect the device to the PC via a USB cable. At this the "Link" LED should turn on. When the device is connected for the first time, driver installation might be required. For further information see [Connecting the device to the PC for the first time](#).
4. Connect the signal sources to the device — see [Connecting to the object](#).

The procedure of disconnecting the the QMBox series devices is as follows:

1. Disconnect the object (signal sources) from the device.
2. Disconnect the device from the PC.
3. Disconnect the power supply from the AC network.
4. Disconnect the power supply from the device.

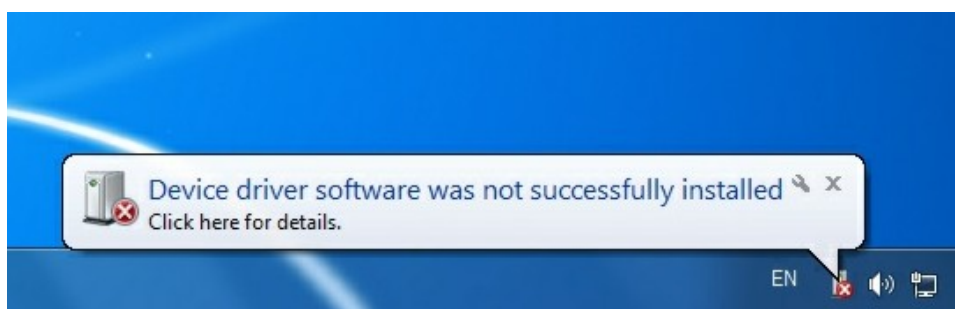
## 4.1. Connecting the device to the PC for the first time

When the QMBox series device is connected to a Windows PC for the first time, it is necessary to specify the location of the device driver.

Before connecting the device to the PC for the first time you should first insert the included CD into the CD-ROM drive of your PC and only then connect the device to the PC via a USB cable.

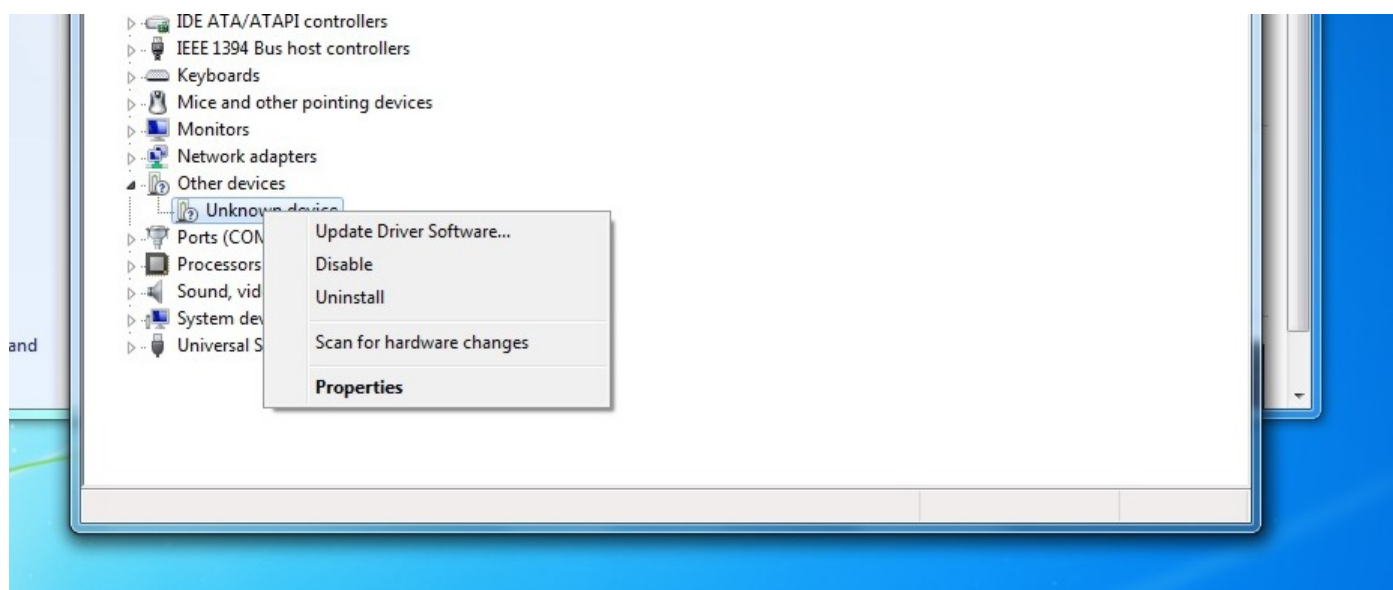
As a rule, having detected a new device, Windows starts the Found New Hardware Wizard. In this case you should follow its instructions, choosing not to go to the Windows Update site and specifying the “\DRV” folder on the included CD as the location of the driver.

Windows might not start the Found New Hardware Wizard automatically, returning a driver error message in the notification area (in the right bottom corner of the screen):

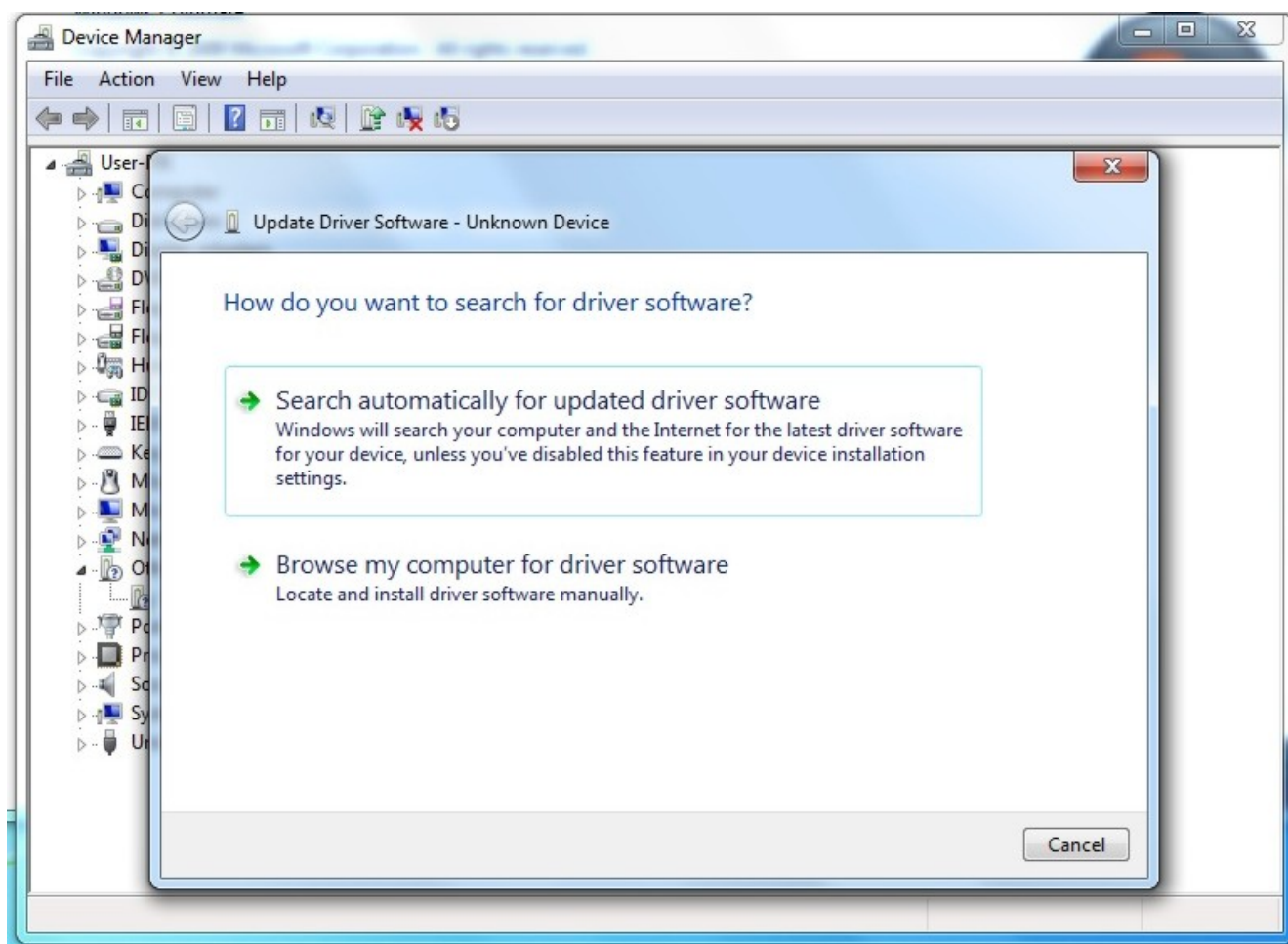


In this case you should start the Device Manager. In different Windows OS versions the Device Manager is started differently. For example, in Windows 7 it can be started by right-clicking the Computer icon, then – Properties, and then – Device Manager.

In the Device Manager QMBox device will appear as Unknown device. You should right-click on it and select “Update Driver Software”:



After this the Found New Hardware Wizard will start up:



You should select “Browse my computer for driver software” and specify the “DRV” folder on the included CD as the location of the driver.

Then you should follow the instructions of the Wizard. Once the driver is successfully installed, the “RT USB30K QMSystem Crate Controller USB” device should appear in the Device Manager:



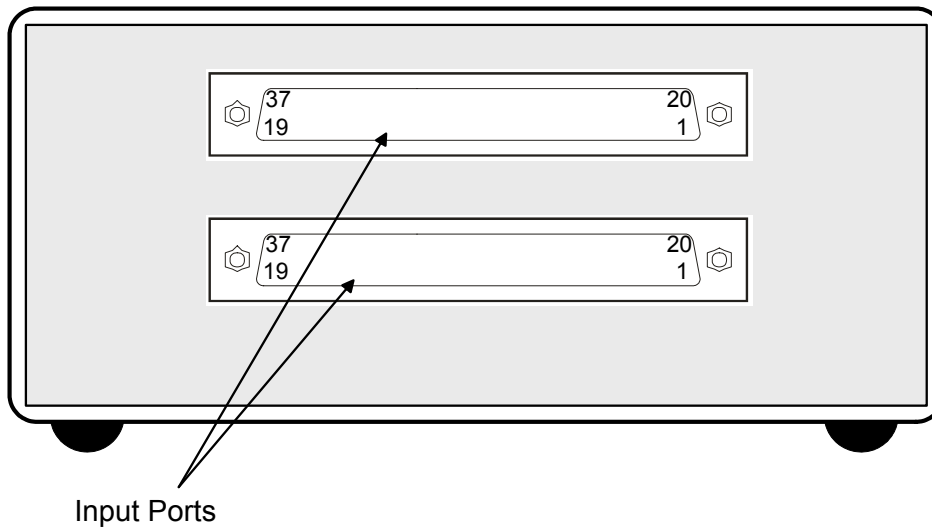
This means that the device’s Interface board has been identified correctly by the PC, the driver is installed and the device is ready to work.

Afterwards, when the QMBox device is connected to another USB port of the PC, Windows might once again detect the QMBox device as “unknown device”. In this case you will have to repeat the driver installation procedure as described above.

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## 4.2. Connecting to the object

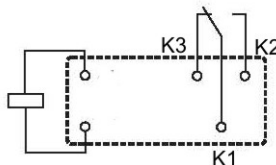
The figure shows the front panel of a QMBox75 device (QMBox75-16 model, consists of 2 QMS75 modules):



Every QMS75 module which is a part of the QMBox75 device has its own input port for the signals connection.



Default contact configuration (after power on) of each relay:



The port of the QMS75 module is described in the table, where NC — the pin is reserved.

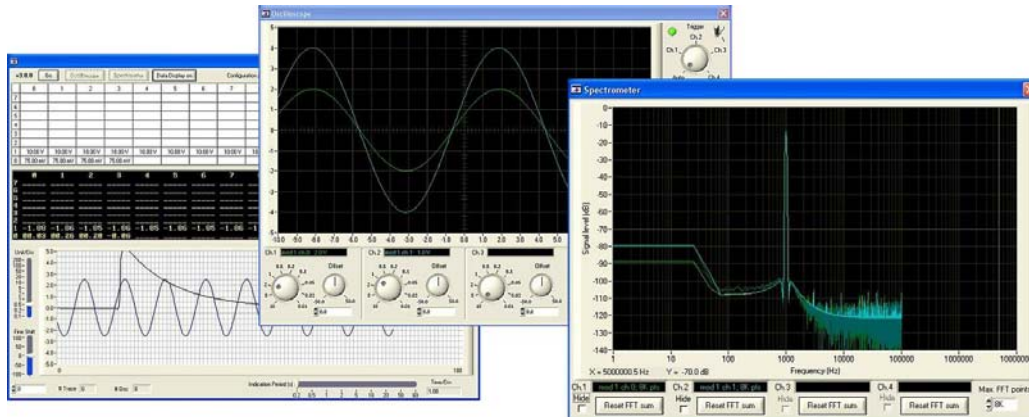
Pin num.	Description	Pin num.	Description
1	K1, Relay #7	20	K1, Relay #8
2	K2, Relay #7	21	K2, Relay #8
3	K3, Relay #7	22	K3, Relay #8
4	K1, Relay #6	23	NC
5	K2, Relay #6	24	NC
6	K3, Relay #6	25	NC
7	K1, Relay #5	26	NC
8	K2, Relay #5	27	NC
9	K3, Relay #5	28	NC
10	K1, Relay #4	29	NC
11	K2, Relay #4	30	NC
12	K3, Relay #4	31	NC
13	K1, Relay #3	32	NC
14	K2, Relay #3	33	NC
15	K3, Relay #3	34	NC
16	K1, Relay #2	35	K1, Relay #1
17	K2, Relay #2	36	K2, Relay #1
18	K3, Relay #2	37	K3, Relay #1
19	NC		

## 5. Software

Software of the QMBox75 devices consists of the following components:

- QMLab software suite
- Software development kit (SDK package)

### 5.1. QMLab software suite



The QMLab software suite is a universal software tool for working with QMBox devices. It allows performing most standard tasks within measurement automation.

A detailed description of the QMLab suite is given in the “**QMLab User Manual**” document that can be found on the site [www.RTechElectronics.com](http://www.RTechElectronics.com) and on the CD supplied with the device.

### 5.2. Software development kit

Apart from the complete QMLab software suite, the QMBox75 delivery set includes an SDK package, which is software and documentation designed for users who would like to create their own applications for working with the device. This software consists of function libraries (API) and examples of software development.

The user has a possibility to create full-blown applications using just a limited number of library functions. These library functions are written so that even an inexperienced programmer who is not well-versed in multithreaded and object-oriented programming can work with the device. A more detailed description of the software development kit is given in the “**QMBox Programming Guide**” document that can be found on the site [www.RTechElectronics.com](http://www.RTechElectronics.com) and on the CD supplied with the device.